



Woodrow Wilson Center for Employment

Drafting/Computer Aided Drafting

Drafting/CAD Operator



Drafting/CAD LAB



Ivy using the "Jouse"
to draw in AutoCAD

- ✱ [Mechanical Drafter](#) (D.O.T. 007.281-010)
Training Days 300 - Hours 1875
- ✱ [Architectural Drafter](#) (D.O.T. 001.261-010)
Training Days 300 Hours 1875
- ✱ [Technical Math](#)
- ✱ [Evaluation](#)
- ✱ [Internship](#)
- ✱ [Advisory Committee](#)
- ✱ [Articulation Agreement](#)

Mechanical

Students will acquire skills and knowledge necessary to develop detailed working drawings used in industrial drafting. Units of study include orthographic projection, isometric drawing, developments and intersections, cam and gears, auxiliary views, lettering and detail, and assembly drawings. Students will employ skills in tolerances and apply other engineering data to drawings.

Completion Requirements - Successful completion prepares the graduate for entry level employment in the field. At enrollment, students are provided the current curriculum competency task sheet. To graduate, a student must complete 100% of core competencies and a minimum of 80% of all other competencies for this course. If licensure or certification is required for the training program, it will be indicated as a requirement on the curriculum competency task sheet.

Architectural

Architectural Drafting is available upon request. A modified curriculum is in place to meet the needs of students wishing to be skilled in residential architecture. Two complete sets of plans are required.

Completion Requirements - Successful completion prepares the graduate for entry level employment in

the field. At enrollment, students are provided the current curriculum competency task sheet. To graduate, a student must complete 100% of core competencies and a minimum of 80% of all other competencies for this course. If licensure or certification is required for the training program, it will be indicated as a requirement on the curriculum competency task sheet.

Technical Math

Technical math is a vital part of today's industry. Students will cover all phases of math including whole numbers, fractions, decimals, measurements, percentages, averages, finance, graphs, applied algebra, applied geometry, and applied trigonometry.

Both the Mechanical and Architectural courses start after the general drafting course outline requirements have been satisfied.

Computer Assisted Drafting

Technical drafting, like all technical areas is constantly changing. CAD (Computer Assisted Drafting) has been added to each course.

The computer has revolutionized the way in which drawings are prepared. Every effort has been made to translate the most current technical information available into the most usable form from the standpoint of both teacher and student. The latest developments and current practices in all areas of CAD have been incorporated into the already popular drafting course. [AutoCAD 2007](#) is presently being taught.

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Evaluation

A prerequisite for (students) entering the Drafting Instructional Program is demonstrated aptitude for this course of study. It is routine for prospective (students) to participate in a short-term vocational assessment to determine their readiness, academically and behaviorally, prior to their entry into the program. Specific work aptitudes evaluated during the drafting assessment include the following:

- General Learning Ability
- Reading comprehension
- Mathematical aptitude
- Spatial aptitude
- Form Perception

Internship

Students who complete the CAD/Drafting program are placed on an internship (S.I.P.) with a local employer to get first hand experience in industry.

Commercial Drafter

Drafters make detailed drawings of buildings, products, and machinery from sketches and specifications conceived by engineers, architects, and designers. The finished drawings are used as working plans for engineering, manufacturing, and construction purposes. To learn more about the commercial drafter, [click here](#)

Articulation Agreement

Blue Ridge Community College (BRCC) and Woodrow Wilson Rehabilitation Center (WWRC) have entered into an [articulation agreement](#). Qualified graduates of the WWRC Drafting/CAD program, who have demonstrated mastery of a cluster of competencies comparable to those specified for certain BRCC

courses, may be awarded advance standing credit as part of their pursuit of an approved Program at BRCC. The decision to grant advance standing credit is based on careful determination of comparable WWRC course competencies by WWRC and BBRC instructors. This arrangement will promote effective and efficient use of the educational opportunities that directly build on student learning at both institutions.

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The Role Of Advisory Committees

Purpose:

- To ensure relevant external influence over the educational and training programs.
- To assure training programs are driven by business, industry, and labor market needs
- To assure that training curricula is current and relevant to occupation-specific employment standards and expectations
- To facilitate access to community-based employment opportunities for persons with disabilities.
- To assist the administration of E&OST to ensure that they are continually striving to meet the occupational education needs of the community

Function:

- Utilized to plan, implement and evaluate instructional programs.
- To define, clearly articulate, and review a mission statement.
- To identify and recommend prerequisite skills for program applicants
- To review and make recommendations regarding the curriculum, including program content, length, objectives, and industry-based equipment and technology.
- To review and make recommendations regarding the program design, including: utilization of up-to-date employment related technology and software programs, methods of evaluation of assessment of employment outcomes; and, level of skills and/or proficiency required for completion of program (e. g. existing, new, or substantially revised)
- Identify and/or provide career guidance and potential student internship and job placement opportunities of training area students and graduates.
- To facilitate opportunities for the program to market itself and its graduates to prospective business/ industry employers.

Our Industry Members:

- [McKee Foods Corporation](#), Stuarts Draft, VA
- [Blue Ridge Community College](#), Weyers Cave, VA
- [Perdue Farm, Inc.](#), Bridgewater, VA
- [Hershey Chocolate of Virginia, Inc.](#), Stuarts Draft, VA
- [Ai Engineering](#), Glen Allen, VA
- [Specialty Blades, Staunton](#), VA
- [James Madison University](#), Harrisonburg, VA.



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COMMERCIAL DRAFTER

DOT Code - 017261026 - Interactive View 1994 - 1995

DESCRIPTION

Drafters make detailed drawings of buildings, products, and machinery from sketches and specifications conceived by engineers, architects, and designers. The finished drawings are used as working plans for engineering, manufacturing, and construction purposes.

DUTIES

Commercial drafters perform general duties in all-around drafting, such as laying-out building locations, planning arrangements in offices, large rooms, and factories, and preparing charts, forms, and records.

- Preparing complete and accurate working plans and detailed drawings from rough or detailed sketches or notes.
- Preparing final sketches and checking dimensions of parts, materials to be used, and the relation of parts to one another and to the whole structure.
- Making any changes necessary or desired on a drawing.
- Tracing drawings in ink.
- Drawing charts for the representation of statistical data.
- Drawing the finished design on copy machines.
- Using computer aided design (CAD) equipment.

OCCUPATIONAL SPECIALTIES

Architectural drafters product architectural and structural working on detail drawings or any type of building or other structure.

Electrical drafters prepare wiring diagrams and drawings of electrical equipment for use by construction and repair workers who build, install, and repair electrical equipment and wiring on communications centers, power plants, industrial establishments, businesses, homes, and electrical distribution systems.

Electronic drafters prepare wiring diagrams and drawings of electrical equipment for use by workers who build, install, and repair electrical equipment and wiring in communications centers, power plants, industrial establishments, businesses, homes, or electrical distribution systems.

Civil drafters prepare detailed construction drawings, topographical profiles, and related maps and specifications sheets used in the planning and construction of highways and in flood control, drainage, and other civil engineering projects.

Mechanical drafters prepare detailed working drawings of machinery and mechanical devices, indicating dimensions and tolerances, fastening and joining requirements, and other engineering data.

Computer-assisted drafters use computer-aided design (CAD) systems to prepare layouts, drawings, and designs for application in aeronautics, automotive design, toll and die design, architecture or electronics, according to specifications from engineers.

Other drafting specialties include automotive, aeronautical, geological, and landscape drafting. Other titles may be used. In union shops, job titles often indicate particular levels of skill and experience.

TOOLS, EQUIPMENT AND MATERIALS

- Blueprints
- Computerized drafting devices
- Calculators * Precision measurement instruments
- Catalogues of standard parts * Protractors
- Compasses * Rulers
- Copy machines * Straight edges
- Dividers * T-squares
- Drafting machines * Technical pens and handbooks
- Engineering tables and manuals * Templates
- French curves * Triangles

WORK CONDITIONS

Drafters may work alone or as members of a drafting team under the direction or supervision of a more experienced drafter, chief drafter, or project director. Depending on their place of employment and their particular job, drafters may work under the supervision of an engineer or architect.

Drafters either sit or stand at drafting tables in well-lighted rooms. They may work in a large room with many other drafters or in a small room by themselves. They may sometimes work at construction sites, in machine shops, or at other places where their drawings are required.

Drafting work can be demanding and requires close attention to detail. Many hours may be spent leaning over tables working on large drawings. Fatigue and eyestrain may result from the close work and concentration.

Drafters generally work a 5 day, 35 to 40 hour week. Overtime may be necessary during busy periods or when deadlines must be met. During economic down-turns, however, drafters may be laid off until the condition of the economy improves.

Drafters may belong to professional associations such as the Association of Structural Draftsmen of America and the American Design Drafting Association. Those who belong to associations are generally required to pay membership fees.

WORK REQUIREMENTS

You should prefer:

- Activities of a scientific or technical nature.
- Activities which involve machines, processes, or methods.

You should be able to:

- Rate information according to measurable standards.
- Work within precise limits or standards of accuracy.
- Understand and apply technical knowledge and theoretical principles involved in drafting.
- Work under pressure.
- Concentrate for long periods of time.
- Perform mathematical computations accurately.

- Visualize 3-dimensional objects from drawings or pictures.
See detail in objects or drawings and recognize slight differences in shapes or shadings.

Physically you must:

- Use your arms, hands, and fingers well to use drafting equipment and complete drawings.
- See well (either naturally or corrected).

CERTIFICATION INFORMATION

There is no certification information available.

NATIONAL EARNINGS

Nationally, the median earnings of drafters were \$27,400 (1993). Computer-assisted drafters earned salaries ranging from \$25,800 to \$34,200 (1993). Drafters working for private employers earned annual average salaries ranging from \$20,100 to \$37,600 depending on their level of responsibility and experience. Drafters with an Associate's degree employed by the federal government in 1992 had starting salaries of \$16,393 per year. Those with less education and no experience began at \$14,603.

The earnings of drafters depend on their education and experience, on the area where they work and the type of company for which they work. Earnings are higher in urban areas and for those working for manufacturing companies. Well-trained, experienced drafters operating computer-aided design equipment generally have higher salaries than other drafters do.

VIRGINIA EARNINGS

In Virginia earnings for drafters depend upon experience, education, and place of employment.

Apprentice drafters earned about 40% of a fully qualified drafter's wage.

Virginia state classified positions related to this occupation had the following annual salary ranges in 1995:

Range:

CADD Technician \$20,514 - \$31,322

CADD Technician Senior \$21,932 - \$33,486

Engineering Design Drafting Technician \$20,514 - \$31,322

Engineering Design Drafting Specialist \$24,515 - \$37,431

Drafters working in manufacturing industries in 1993 had the following weekly wages in the following areas of the state:

Across Virginia \$467 - 637

Mount Rogers area \$467 - 1742

Bristol City \$382 - 1742

Central Shenandoah area \$382 - 552

Northeastern counties \$382 - 637

Northern Virginia area \$467 - 637

Charlottesville city area \$382 - 637

Central Virginia area \$467 - 722

Lynchburg city \$637 - 722

West Piedmont area \$340 - 680

Richmond area \$467 - 637

Fredericksburg city area \$467 - 807

Hampton Roads area \$382 - 637
Norfolk city \$382 - 637

Region 1: far Southwest Virginia - Lee, Scott, and Wise counties and Norton city

Region 2: the Cumberland Plateau - Buchanan, Dickenson, Russell, and Tazewell counties

Region 3: Mount Rogers area - Bland, Carroll, Grayson, Smyth, Washington, and Wythe counties; Bristol and Galax cities

Region 4: New River Valley area - Floyd, Giles, Montgomery, and Pulaski counties; Radford city

Region 5: the Roanoke Valley area - Alleghany, Botetourt, Craig, and Roanoke counties; Clifton Forge, Covington, Roanoke, and Salem cities

Region 6: Central Shenandoah area - Augusta, Bath, Highland, Rockbridge, and Rockingham counties; Buena Vista, Harrisonburg, Lexington, Staunton, and Waynesboro cities

Region 7: Northeastern counties area - Clarke, Frederick, Page, Shenandoah, and Warren counties; Winchester city

Region 8: Northern Virginia area - Arlington, Fairfax, Loudoun, and Prince William counties; Alexandria, Fairfax, Falls Church, Manassas and Manassas Park cities

Region 9: Rappahannock area - Culpeper, Fauquier, Madison, Orange, and Rappahannock counties

Region 10: Charlottesville city - Albemarle, Fluvanna, Greene, Louisa, and Nelson counties; Charlottesville city

Region 11: Central Virginia area - Amherst, Appomattox, Bedford, and Campbell counties; Bedford and Lynchburg cities

Region 12: West Piedmont area - Franklin, Henry, Patrick, and Pittsylvania counties; Danville and Martinsville cities

Region 13: Southside area - Brunswick, Halifax, and Mecklenburg counties; South Boston city

Region 14: Piedmont area - Amelia, Buckingham, Charlotte, Cumberland, Lunenburg, Nottoway, and Prince Edward counties

Region 15: Richmond city and surrounding counties area - Charles City, Chesterfield, Goochland, Hanover, Henrico, New Kent, and Powhatan counties; Richmond city

Region 16: Fredericksburg city and surrounding counties area - Caroline, King George, Spotsylvania, and Stafford counties; Fredericksburg city

Region 17: Northern Neck area - Lancaster, Northumberland, Richmond and Westmoreland counties

Region 18: Middle Peninsula area - Essex, Gloucester, King and Queen, King William, Mathews, and Middlesex counties

Region 19: Petersburg city and surrounding counties area - Dinwiddie, Greensville, Prince George, Surry, and Sussex counties; Colonial Heights, Emporia, Hopewell and Petersburg cities

Region 20: Hampton Roads area - Isle of Wight; James City, Southampton, and York counties; Chesapeake, Franklin, Hampton, Newport News, Norfolk, Poquoson, Portsmouth, Suffolk, Virginia Beach, and Williamsburg cities

Region 21: Accomack-Northampton area - Accomack and Northampton counties

FRINGE BENEFITS

Fringe benefits received by drafters depend on the size and type of company worked for and the length of time the drafter has worked there. Most drafters receive paid vacations and holidays. Additional benefits may include paid health, accident, and dental insurance, retirement plans, and sick leave.

CAREER LADDER

Drafters without experience or post-high school technical training usually start out as tracers. Some also begin as apprentices. A general career ladder may be:

- Senior Drafter or Chief Drafter
- Drafter
- Junior Drafter
- Tracer/Apprentice

It usually takes three to four years for a beginning drafter to become a qualified drafter. Some drafters may complete college programs which allow them to become technicians, engineers, or architects. These professions require more education and training than drafting.

OPPORTUNITIES FOR EXPERIENCE

Summer and part-time work may be available through many businesses which hire drafters. Co-op or work experience programs may be available through high schools, area skill centers, or community colleges. Experience can also be gained through a formal apprenticeship program or any branch of the military services.

METHOD OF ENTRY

To get a job as a drafter, apply directly to employers. Jobs may be located by consulting school/college placement offices, an apprenticeship specialist at a local office of the Virginia Employment Commission, and newspaper want ads. For jobs with government agencies, contact civil service offices. The American Institute for Design and Drafting also lists openings in its monthly publication, Design and Drafting News.

NATIONAL EMPLOYMENT OUTLOOK

Nationally, there were approximately 314,000 drafters employed in 1992. The projected employment for 2005 is 350,000. An estimated 35,000 job openings are expected between 1992 and 2005. Employment is expected to grow more slowly than the average for all occupations through 2005/ More drafters will be needed to provide support to a growing number of scientists and engineers and to deal with increasingly complex design problems. Widespread use of computer-aided design equipment will increase productivity and could affect employment growth. Opportunities are best for persons with Associate degrees in drafting and those trained in the use of computer-aided drafting equipment.

VIRGINIA EMPLOYMENT OUTLOOK

Number Employed in 1990: 8,410
2005 Projected Employment: 8,889
Average Annual Growth: 281
Openings Due to Growth: 32
Openings Due to Separation: 249

LEVEL OF EDUCATION

Listed below are the levels of education and training usually needed for this VIEWscript:

- High school diploma or GED (including vocational education)
- Private Career School
- Community College
- Apprenticeship

Listed below are the levels of education and training also available for this VIEWscript:

- College - Bachelor's Degree

SCHOOL SUBJECTS

Algebra

Blueprint Reading
Co-op Education
Computer Literacy
Drawing and Design
Geometry
Graphic Arts
Industrial Arts
Mechanical Drawing
Printing
Trigonometry

POST SECONDARY PROGRAM - DRAFTING

Programs in drafting provide opportunities to gain the knowledge and skills needed for employment in any of the many architectural, engineering, and manufacturing fields that require detailed drawings of structures, products, and machinery. Courses will vary from school to school but may include:

- Architectural projections
- Descriptive geometry
- Working drawings
- Industrial drafting
- Materials of construction
- Blueprint reading
- Building codes
- Jigs and fixtures
- Mechanical equipment
- Die design and construction
- Structural design
- Auto body design

2-YEAR PUBLIC AND PRIVATE SCHOOLS

Many schools may offer some courses which may be helpful in entering this occupation.

4-YEAR PUBLIC COLLEGES AND UNIVERSITIES

Many schools may offer some courses which may be helpful in entering this occupation.

4-YEAR PRIVATE COLLEGES AND UNIVERSITIES

Many schools may offer some courses which may be helpful in entering this occupation.

PRIVATE CAREER SCHOOLS

Maryland Drafting Institute
8001 Forbes Place
North Springfield, VA 22151
(703-321-9777)

Drafting/Design Technology
Electro-Mechanics Drafting
Drafting/Design Technology
Architectural Drafting Technology
Drafting/Design Technology
Engineering Drafting Technology

APPRENTICESHIP INFORMATION

Some people enter this occupation through an apprenticeship program. This apprenticeship program is a formal training program that generally takes 4 years to complete with most of the time spent on the job. Apprenticeship programs for this occupation usually include:

WHAT IS LEARNED ON THE JOB

- Calculating measurements
- Changing and modifying drawings
- Designing architectural motifs
- Detailing drawings and alternations
- Finalizing working drawings
- Routing drafting department work
- Tracing and copying drawings

WHAT IS LEARNED IN THE CLASSROOM

- Algebra
- Applied electricity
- Applied physics
- Basic building codes
- Detailing design
- Elementary statistics
- Estimating
- Geometry
- Hydraulics and pneumatics
- Industrial drafting
- Jigs and fixtures
- Machine shop practice (bench work, mill work, lathe work, and grinding)
- Safety practices
- Strength of materials
- Technical illustration
- Trigonometry
- Types of machine tools

MILITARY TRAINING

Title: Drafters

Alternate Titles: Construction Drafters, Civil Drafters

Services Offering This Occupation: Army, Navy, Air Force, Coast Guard

Officer/Enlisted: Enlisted

Background: The military builds and repairs many airstrips, barracks, roads, and other projects each year. Construction crews need plans to identify the locations, designs, and materials to be used during construction. Drafters prepare detailed plans and drawings for construction projects.

What They Do: Drafters in the military perform some or all of the following duties: Make scale drawings of roads, airfields, buildings, and other military projects from engineers' instructions and sketches; draw diagrams for wiring and plumbing; identify concrete, lumber, and other materials needed to construct projects; compute the cost of materials; work with engineers and construction supervisors to change drawings when needed.

SUPPLY DATA

The following chart shows in Virginia (1991-92) the number of individuals completing training

programs for drafter.

DEGREE AWARDED	PROGRAM TITLE	COMPLETERS
Secondary Voc. Ed.	General Drafting	484
	Architectural Drafting	25
	Mechanical Drafting	90
Adult Voc. Ed.	General Drafting	91
	Mechanical Drafting	128
Private Career School	Architectural Drafting	31
	Drafting and Design Technology	3
Cert/Dipl., Com. College	Engr & Engr-Related Techs	42
	General Drafting	57
	Architectural Drafting	11
Associate, Com. College	Drafting and Design Technology	111
	Other Engr & Engr-Related Techs	44
	Architectural Drafting	43
Bachelor or Higher	Drafting and Design Technology	4
	Engineering/Related Techs	131

Training programs vary according to title, length, and course offerings. Programs with the same or similar title may not always offer preparation for the same occupation. Therefore, the number of completers may not be indicative for this occupation

**Articulation Agreement
Between
Blue Ridge Community College
&
Woodrow Wilson Center for Employment**

Blue Ridge Community College (BRCC) and Woodrow Wilson Rehabilitation Center (WWRC) enter into the following articulation agreement. In order to ensure that qualified graduates of the WWRC program in Drafting/CAD, who have demonstrated mastery of a cluster of competencies comparable to those specified for certain BRCC courses, may be awarded advance standing credit as part of their pursuit of an approved Program at BRCC. The decision to grant advance standing credit is based on careful determination of comparable WWRC course competencies by WWRC and BRCC instructors. This arrangement will promote effective and efficient use of the educational opportunities that directly build on student learning at both institutions.

1. Students, who complete the group of courses specified in this document and graduate from WWRC shall be awarded advanced standing credit for BRCC courses specified in this agreement, provided the conditions herein set forth are met.
2. WWRC will maintain a course record for each student that identifies area and levels of achievement. The record will become a part of the student's official WWRC school record.
3. The student must be admitted to BRCC, enroll in the specified BRCC curriculum, and present the official Career Certification Completion Record showing completion of the specified group of courses with a grade of "B" or better in each course. These actions must be completed within two years following the student's graduation from WWRC.
4. The specified BRCC credits to be awarded through advance standing will be held in escrow until the student has completed 15 curriculum credit hours at BRCC with a GPA of 2.0 or better. At least 6 of the 15 curriculum credit hours must be in the disciplines identified in the agreement. Any BRCC curricular courses taken through dual or concurrent enrollment will count towards completion of the requisite 15 curricular credits. This requirement of 15 curricular hours must be met within two year of initial enrollment at BRCC.
5. Upon completion of the courses at WWRC, the student will receive a Career Certification Completion Record that will list those courses taken within the confines of the Articulation Agreement and the eligible escrow credit available at BRCC. It shall be the responsibility of the student to request the BRCC Admission and Records office to award the advanced standing credit held in escrow. No additional examination will be required for awarding BRCC credit, nor will an additional fee be required.
6. By October of each year, the Articulation Committee will review and re-sign the agreement to ensure that WWRC and BRCC course objectives remain congruent.

